



Department of Energy  
Carlsbad Field Office  
P. O. Box 3090  
Carlsbad, New Mexico 88221

MAY 15 2003



ENTERED



Mr. James P. Bearzi, Chief  
Hazardous Waste Bureau  
New Mexico Environment Department  
2905 E. Rodeo Park Drive, Bldg. 1  
Santa Fe, New Mexico 87505-6303

Subject: Response to NMED Comments on Waste Stream Profile Form LA-OS-00-01  
(WIPP Eligible OSR Sealed Sources) WIPP Hazardous Waste Facility Permit  
EPA ID No. 4890139088

Dear Mr. Bearzi:

The purpose of this letter is to provide a response to your May 12, 2003 letter concerning Waste Stream Profile Form LA-OS-00-01 (WIPP Eligible OSR Sealed Sources). New Mexico Environmental Department (NMED) expressed concern about a statement in the Acceptable Knowledge (AK) Summary that indicated that "other light metals" could be present in this waste stream and by omission of specific language regarding light elements one could conclude that this waste stream may include nonradionuclide pyrophoric light metals, which are prohibited from disposal at the Waste Isolation Pilot Plant.

LA-OS-00-01 is a non-mixed waste stream as described on the Waste Stream Profile Form and the AK Summary. Light elements mentioned in the AK Summary do not include elements, which are regulated under the hazardous waste rules. Non-regulated light elements are discussed in the AK Summary to address transportation /safety. This ensures that any changes through continuing characterization will address these parameters as well as RCRA requirements. Examples of light elements included in the waste stream, in addition to Beryllium, would be Fluoride and Boron. There are very few Fluoride or Boron sources known to exist. It is true that there are sealed sources that contain Lithium. This is also a very small population. However, sources containing Lithium are not part of this waste stream.

Enclosed is a change notice that has been certified by the generator for LA-OS-00-01 (WIPP Eligible OSR Sealed Sources) containing the updates to the AK Summary highlighted below:

The fourth paragraph on page 14 of the AK Summary has been revised to state: "All sealed sources currently identified for WIPP disposal contain varying combinations of plutonium, americium, or other transuranic elements, may or may not contain beryllium or other light elements or create neutron emission, and have similar physical construction. In this particular waste stream, OS-00-01, examples of other light elements are fluoride and boron. However, this waste stream does not contain lithium."

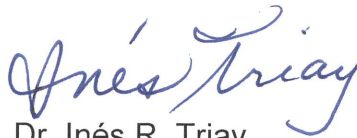


MAY 15 2003

The last paragraph on page 14 of the AK Summary has been revised to state: "OSR sealed sources constitute a closed system (manufactured, solid isotopic sources sealed in metal jackets or casings) that preclude the introduction of extraneous materials that would be ignitable, reactive, or corrosive. Lithium is found in some radioactive sources; however it is not in any of the sources in this waste stream (OS-00-01). The waste itself is not ignitable, reactive, or corrosive. VE performed during packaging of the sealed sources into drums is used to verify the absence of any indicators of ignitable, reactive, or corrosive wastes."

If you have any questions, please contact Mr. Kerry Watson at (505) 234-7357.

Sincerely,



Dr. Inés R. Triay  
Manager

Enclosure

cc: w/enclosure  
S. Zappe, NMED

cc: w/o enclosure  
J. Kieling, NMED  
K. Watson, CBFO  
R. Knerr, CFBO  
E. Rose, CBFO  
G. Johnson, WTS  
R. Chavez, WRES  
S. Johansen, WRES  
S. Casey, WTS  
CBFO M&RC

**Change Notice No. 1**  
**Update for WIPP Operating Record**  
**WIPP-Eligible OSR Sealed Sources (WSPF #LA-OS-00-01)**

Please add the following information to the WIPP Operating Record for: WSPF # LA-OS-00-01. This waste stream is WIPP-eligible OSR Sealed Sources and was approved by DOE/CBFO on April 23, 2003. The purpose of this change notice is to clarify questions from NMED regarding delineation of the waste stream and the presence of lithium in sealed sources. No changes to the WSPF are required and the scope of the changes described in this Change Notice are limited to the Acceptable Knowledge (AK) Summary.

The components of the AK Summary requiring clarification are bolded. The updates are:

1. **AK Summary, Page 14: The last paragraph under Delineation of the Waste Stream:** change to read:

All sealed sources currently identified for WIPP disposal contain varying combinations of plutonium, americium, or other transuranic elements, may or may not contain beryllium or other light elements or create neutron emission, and have similar physical construction. **In this particular waste stream, OS-00-01, examples of other light elements are fluoride and boron. However, this waste stream does not contain lithium, which, in certain forms, has the potential to exhibit the RCRA characteristic of reactivity.**

2. **AK Summary, Page 14: The paragraph under Ignitability, Corrosivity, and Reactivity** change to read:

OSR sealed sources constitute a closed system (manufactured, solid isotopic sources sealed in metal jackets or casings) that preclude the introduction of extraneous materials that would be ignitable, reactive, or corrosive. **Lithium is found in some radioactive sources; however, it is not in any of the sources in this waste stream (OS-00-01).**

**NOTE:** The changes indicated in this Change Notice do not affect certified processes for characterization of the waste, assignment of Hazardous Waste Numbers (HWNs) or the Waste Matrix Code (WMC) that is assigned to this waste stream under the approved WSPF.

**Change Notice #1/Update for WIPP Operating Record (WSPF LA-OS-00-01) certification:**

I hereby certify that I have reviewed the information in this Change Notice, and it is complete and accurate to the best of my knowledge. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Sandy Wander

Signature of Site Project Manager

Sandy Wander, SPM

Printed Name and Title

5-15-03

Date

WIPP WASTE STREAM PROFILE FORM			
Waste Stream Profile Number:		LA-OS-00-01	
Generator site name:		LANL	Technical Contact: Mavis Lin
Generator site EPA ID:		NM0890010515	Technical contact phone number: (505) 667-7376
Date of audit report approval by NMED:		2/25/2003	
Title, version number, and date of documents used for WAP certification: Transuranic Waste Quality Assurance Project Plan (QAPjP) (TWCP-PLAN-0.2.3-001,R.8), 02/24/03; and Transuranic Waste Certification Plan (TWCP-PLAN-0.2.4-001,R.6), 05/22/02			
Did your facility generate this waste? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
If no, provide the name and EPA ID of the original generator:			
WIPP ID: NA for newly generated waste		Summary Category Group: S5000	
Waste Matrix Code Group: S5100		Waste Stream Name: WIPP eligible OSR sealed sources	
Description from the WTWBIR: NA <sup>a</sup>			
Defense Waste: <input checked="" type="checkbox"/> yes <input type="checkbox"/> no		Check one <input checked="" type="checkbox"/> CH <input type="checkbox"/> RH	
Number of SWBs: 0		Number of Drums: 149 <sup>b</sup>	Number of Canisters: 0
Batch Data Report numbers supporting this waste stream characterization		See Table "Correlation of Container Identification Number to BDRs"	
List applicable EPA Hazardous Waste Codes <sup>(2)</sup>		None <sup>c</sup>	
Applicable TRUCON Content Codes:		LA120A/LA220A	
<b>Acceptable Knowledge Information<sup>(1)</sup></b>			
[For the following, enter supporting documentation used (i.e., references and dates)]			
<b>Required Program Information</b>			
• Map of site:		OSR-MISC-003, R.3, 11/25/02, Attachment 2	
• Facility mission description:		OSR-MISC-003, R.3, 11/25/02, Section 3.1	
• Description of operations that generate waste:		OSR-MISC-003, R.3, 11/25/02, Section 3.5 and attachment 5	
• Waste identification/categorization schemes:		OSR-MISC-003, R.3, 11/25/02, Section 3.0	
• Types and quantities of waste generated:		OSR-MISC-003, R.3, 11/25/02, Section 3.4	
• Correlation of waste streams generated from the same building and process, as appropriate:		OSR-MISC-003, R.3, 11/25/02, Section 3.0 and 5.0	
• Waste certification procedures:		See attached list of TWCP plans and procedures and OSR procedure for newly generated waste.	
<b>Required Waste Stream Information</b>			
• Area(s) and building(s) from which the waste stream was generated:		See attached AK Summary for Waste Stream OS-00-01	
• Waste stream volume and time period of generation:		See attached AK Summary for Waste Stream OS-00-01	
• Waste generating process description for each building:		See attached AK Summary for Waste Stream OS-00-01	
• Process flow diagrams:		See attached AK Summary for Waste Stream OS-00-01	
• Material inputs of other information identifying chemical/radionuclide content and physical waste form:		OSR-MISC-003, R.3, 11/25/02, Section 3.6	
Which Defense Activity generated the waste: (check one)			
<input type="checkbox"/> Weapons activities including defense inertial confinement fusion			
<input checked="" type="checkbox"/> Naval reactors development			
<input type="checkbox"/> Verification and control technology			
<input type="checkbox"/> Defense research and development			
<input type="checkbox"/> Defense nuclear waste and material by-products management			
<input type="checkbox"/> Defense nuclear materials production			
<input type="checkbox"/> Defense nuclear waste and materials security and safeguards and security investigations			

<b>Supplemental Documentation</b>		
Process design documents:	None Compiled	
Standard operating procedures:	None Compiled	
Safety Analysis Reports:	None Compiled	
Waste packaging logs:	None Compiled	
Test plans/research project reports:	None Compiled	
Site Databases:	TWCP-AK-2.1-019, R.0, 3/3/03	
Information from site personnel:	OSR-MISC-003, R.3, 11/25/02	
Standard industry documents:	None Compiled	
Previous analytical data:	None Compiled	
Material safety data sheets	None Compiled	
Sampling and analysis data from comparable/surrogate waste:	None Compiled	
Laboratory notebooks:	None Compiled	
<b>Sampling and Analysis Information <sup>(2)</sup></b>		
[For the following, when applicable, enter procedure title(s), number(s) and date(s)]		
Radiography:	N/A for newly generated wastes	
Visual Examination:	Visual Examination and Packaging of OSR Sealed Sources (OSR-OP-120, R.7/IC2) 3/5/03	
<b>Headspace Gas Analysis:</b>		
VOCs:	Headspace Gas Sampling Using an Automated Manifold (TWCP-DTP-1.2-041, R.3) 08/14/00 through (TWCP-DTP-1.2-041, R.4/IC4) 08/30/01	
Flammable:	Headspace Gas Sampling Using an Automated Manifold (TWCP-DTP-1.2-041, R.3) 08/14/00 through (TWCP-DTP-1.2-041, R.4/IC4) 08/30/01	
Other gases (specify):	None	
<b>Homogeneous Solids/Soils/Gravel Sample Analysis</b>		
Total metals:	N/A for OSR Sealed Sources, a noncombustible debris waste	
PCBs:	N/A for OSR Sealed Sources, a noncombustible debris waste	
VOCs:	N/A for OSR Sealed Sources, a noncombustible debris waste	
Nonhalogenated VOCs:	N/A for OSR Sealed Sources, a noncombustible debris waste	
Semi-VOCs:	N/A for OSR Sealed Sources, a noncombustible debris waste	
Other (specify):	None	
<b>Waste Stream Profile Form Certification:</b>		
I hereby certify that I have reviewed the information in this Waste Stream Profile Form, and it is complete and accurate to the best of my knowledge. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of imprisonment for knowing violations.		
<u>Sandy Wander</u>	<u>Sandy Wander, SPM</u>	<u>4-14-03</u>
Signature of Site Project Manager	Printed Name and Title	Date
<b>NOTE:</b> (1) Use back of sheet or continuation sheets, if required. (2) If Radiography, visual examination, headspace gas analysis, and/or homogeneous solids/soils/gravel sample analysis were used to determine EPA Hazardous Waste Codes, attach signed summary reports documenting this determination.		

**NOTE:**

- a. The OSR WTWBIR is not included in the current TWBIR.
- b. The total containers for OS-00-01 waste stream are approximately 149 from 214 sources.
- c. See Table 1: Headspace Gas Summary Data. Additional detail can be found in the AK Summary.

**LIST OF DOCUMENT DATES FOR DOCUMENTS REFERENCED IN THE WSPF**  
(CURRENT AS OF 3/25/03)

Document ID	Effective Date	Title
OSR-MISC-003, R.3	11/25/02	Acceptable Knowledge Summary Report For WIPP-Eligible Off-Site Source Recovery Sealed Sources
OSR-OP-120, R.7/IC2	3/5/03	Visual Examination and Packaging of OSR Sealed Sources
OSR-MISC-002, R.2	11/9/01	Off-site Source Recovery Transuranic Waste Interface Document (LAUR-01-6193)
TWCP-DTP-1.2-006, R.7/IC2	2/28/2003	Calculation of UCL (90) Values
TWCP-DTP-1.2-025, R.4/IC1*	12/20/2000	Headspace Gas Analysis Batch Data Report Preparation
TWCP-DTP-1.2-029, R.8/IC1	6/28/2002	Determining Isotopic Ratios in Waste Containers Using the RANT PC/FRAM Assay System
TWCP-DTP-1.2-041, R.4/IC4*	8/30/2001	Headspace Gas Sampling and Analysis Using an Automated Manifold
TWCP-DTP-1.2-059, R.2/IC1	10/4/2002	Operating the High Efficiency Neutron Counter Using INCC
TWCP-DTP-1.2-060, R.1	5/17/2002	Calibrating the High Efficiency Neutron Counter Using INCC
TWCP-DTP-1.2-064, R.5/IC1	10/8/02	Waste Characterization Data Reconciliation with Acceptable Knowledge And Acceptable Knowledge Accuracy Reporting
TWCP-DTP-1.2-066, R.1/IC1	9/3/2002	Verification and Validation of NDA Data Using a Manual Review Method
TWCP-DTP-1.2-067, R.2	5/17/2002	Verification and Validation of Non-Destructive Assay Data Using an Automated Review Method
TWCP-PLAN-0.2.3-001, R.8	2/24/2003	Los Alamos National Laboratory Transuranic Waste Characterization Quality Assurance Project Plan
TWCP-PLAN-0.2.4-001, R.6	5/22/2002	Los Alamos National Laboratory Transuranic Waste Certification Plan
TWCP-PLAN-0.2.6-001, R.4	8/16/2000	Los Alamos National Laboratory Transuranic Waste Quality Assurance Management Plan
TWCP-AK-2.1-019, R.0	3/3/03	Acceptable Knowledge Information Summary for LANL Transuranic Waste Streams
TWCP-QP-1.1-010, R.12/IC5	2/28/2003	Project Level Data Validation and Verification
TWCP-QP-1.1-021, R.6/IC2	9/26/2002	Acceptable Knowledge Documentation
TWCP-QP-1.1-024, R.7/IC2	2/20/2003	Reporting Waste Stream Summaries to CBFO
TWCP-QP-1.1-028, R.8/IC2	1/28/2003	Reconciliation of Visual Examination and Radiography Information
TWCP-QP-1.1-034, R.10/IC8	3/5/2003	WIPP Waste Information System (WWIS) Data Entry
TWCP-QP-1.1-040, R.1/IC4	10/24/2002	Tracking and Reporting of Tentatively Identified Compounds

\* Procedures TWCP-DTP-1.2-025 and TWCP-DTP-1.2-041 had been deactivated because LANL automated manifold unit is no longer in use. The Hgas data for the UCL90 calculations shown in Table 1 of the CIS were collected under these two procedures.

**LOS ALAMOS NATIONAL LABORATORY  
TRANSURANIC WASTE  
CHARACTERIZATION/CERTIFICATION PROJECT**

**Characterization Information Summary**

**WSPF # LA-OS-00-01**

**Table of Contents:**

**Characterization Information Cover Page**

**Correlation of Container Identification Numbers to BDRs**

**Reconciliation with Data Quality Objectives**

**Headspace Gas Summary Data**

**Solid Sampling Summary**

**Metals Summary Data**

**Total VOC Summary Data**

**Total SVOC Summary Data**

**RTR / VE Summary of Prohibited Items and AK Confirmation**

**Acceptable Knowledge Summary for Waste Stream OS-00-01**

**Characterization Information Summary Cover Page**

**Waste Stream Profile Form Number:** LA-OS-00-01

**AK Summary Report Record Number:** OSR-MISC-003.R.3

Site Project Manager Sandy Wander Sandy Wander Date: 4-14-03  
Printed Name Signature

Site Project QA Officer PETER LINDAHL Peter Lindahl Date: 4/14/2003  
Printed Name Signature

SPQAO signature indicates that the information presented in this package is consistent with analytical batch reports.

SPM signature indicates concurrence with all information presented in this report.

**Correlation of Container Identification Numbers to Batch Data Reports (BDR)**WSPF Number: LA-OS-00-01 – WIPP eligible OSR sealed sources

Drum ID	Headspace Gas BDR	RTR BDR	NDA BDRs		VE BDR	Solid Sampling BDR	Solids Analytical BDR
			FRAM	TGS			
58565	LA01-HGAS-024	NA	LA01-FRAM-027	LA01-TGS-008	LA01-OSR-VE-004	NA	NA
58567	LA01-HGAS-024	NA	LA01-FRAM-027	LA01-TGS-008	LA01-OSR-VE-004	NA	NA

**Note**

Off-site Source Recovery Waste is newly generated waste. Containers are visually examined in lieu of radiography.

**Form A**  
**Reconciliation with Data Quality Objectives**

I certify by signature (below) that sufficient data have been collected to determine the following Program-required waste parameters:

**WSPF # LA-TA-55-30- Mixed Noncombustible and Combustible Debris**

Item	Check Box <sup>a</sup>	Reconciliation Parameter
1	✓	Waste Matrix Code.
2	✓	Waste Material Parameter Weights for individual containers.
3	✓	The waste matrix code/group identified is consistent with the type of sampling and analysis used to characterize the waste.
4	✓	Container mass and activities of each radionuclide of concern.
5	✓	Each waste container of waste contains TRU radioactive waste.
6	✓	Mean concentrations, UCL <sub>90</sub> for the mean concentrations, standard deviations, and number of samples collected for each VOC in the headspace gas of waste containers in the waste stream/waste stream lot.
7	N/A	Mean concentrations, UCL <sub>90</sub> for the mean concentrations, standard deviations, and number of samples collected for VOCs in the waste stream/waste stream lot. Summary Categories S3000 and S4000.
8	N/A	Mean concentrations, UCL <sub>90</sub> for the mean concentrations, standard deviations, and number of samples collected for SVOCs in the waste stream/waste stream lot. Summary Categories S3000 and S4000.
9	N/A	Mean concentrations, UCL <sub>90</sub> for the mean concentrations, standard deviations, and number of samples collected for metals in the waste stream/waste stream lot. Summary Categories S3000 and S4000.
10	✓	Sufficient number of samples was taken to meet statistical sampling requirements
11	✓	Only validated data were used in the above calculations, as documented through the site data review and validation forms and process.
12	✓ <sup>b</sup>	Waste containers were selected randomly for sampling as documented in site procedures.
13	✓	The potential flammability of TRU waste headspace gases.
14	✓	Sufficient number of waste containers was visually examined to determine with a reasonable level of certainty that the UCL <sub>90</sub> for the misclassification rate is less than 14 percent.
15	✓	The waste stream exhibits a toxicity characteristic (TC) under 40 CFR Part 261, Subpart C.
16	✓	All TICs were appropriately identified and reported in accordance with the requirements of the WAP Section B3-1 prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
17	✓	The overall completeness, accuracy, comparability, and representativeness QAOs were met for each of the analytical testing procedures as specified in the WAP Sections B3-2 through B3-9 prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
18	✓	The RTLs (i.e., PRQLs) for all analyses were met prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
19	✓	The waste stream can be classified as hazardous/ <u>non-hazardous</u> (underline one) at the 90 percent confidence level.
20	✓	An appropriate packaging configuration and Drum Age Criteria (DAC) were applied and the drum age was met prior to sampling.

a. Check (✓) indicates that data or acceptable knowledge are sufficient to determine the waste parameters and that the waste parameters have been reported in the listed document or database. N/A indicates parameter does not apply to waste stream.

b. Off-site Source Recovery Waste is newly generated waste. Every container is visually examined.

Sandy Wander  
 Signature of Site/Project Manager

Sandy Wander  
 Printed Name

4-14-03  
 Date

## Data Summary Report - Table 1: Headspace Gas Summary Data

WSPF #: LA-OS-00-01, WIPP eligible OSR sealed sources

## 1A: UCL90 Calculation Summary for Headspace Gas Data Using 0.5 MDL

ANALYTE	# of Samples	# of Samples > MDL	Mean <sup>a</sup>	SD <sup>a</sup>	UCL <sub>90</sub> <sup>a</sup>	PRQL <sup>a</sup>	Max Concentration <sup>a</sup>	EPA HWN <sup>b</sup>
Methanol	2	0	16.98	0	16.98	100	ND	
Ethyl Ether	2	0	1.40	0	1.40	10	ND	
1,1-Dichloroethylene	2	0	1.37	0	1.37	10	ND	
1,1,2-Trichloro-1,2,2-trifluoroethane	2	0	1.59	0	1.59	10	ND	
Acetone	2	0	24.24	0	24.24	100	ND	
Methylene Chloride	2	0	0.85	0	0.85	10	ND	
1,1-Dichloroethane	2	0	1.85	0	1.85	10	ND	
cis-1,2-Dichloroethylene	2	0	2.32	0	2.32	10	ND	
Methyl ethyl ketone	2	0	27.02	0	27.02	100	ND	
Chloroform	2	0	1.83	0	1.83	10	ND	
1,1,1-Trichloroethane	2	0	1.92	0	1.92	10	ND	
Cyclohexane	2	0	2.24	0	2.24	10	ND	
Carbon Tetrachloride	2	0	1.79	0	1.79	10	ND	
Benzene	2	0	1.20	0	1.20	10	ND	
1,2-Dichloroethane	2	0	1.61	0	1.61	10	ND	
Trichloroethylene	2	0	1.70	0	1.70	10	ND	
Butanol	2	0	18.10	0	18.10	100	ND	
Methyl isobutyl ketone	2	0	17.88	0	17.88	100	ND	
Toluene	2	0	2.19	0	2.19	10	ND	
Tetrachloroethylene	2	0	2.26	0	2.26	10	ND	
Chlorobenzene	2	0	2.91	0	2.91	10	ND	
Ethyl Benzene	2	0	2.89	0	2.89	10	ND	
m- and p-Xylene	2	0	4.49	0	4.49	10	ND	
o-Xylene	2	0	2.72	0	2.72	10	ND	
Bromoform	2	0	2.11	0	2.11	10	ND	
1,1,2,2-Tetrachloroethane	2	0	3.07	0	3.07	10	ND	
1,3,5-Trimethylbenzene	2	0	1.96	0	1.96	10	ND	
1,2,4-Trimethylbenzene	2	0	1.94	0	1.94	10	ND	
Hydrogen	2	0	0.01	0	0.01	0.1	ND	
Methane	2	0	0.01	0	0	0.1	ND	
Formaldehyde <sup>c</sup>	0	NA	NA	NA	NA	10	NA	
trans-1,2-Dichloroethylene <sup>d</sup>	0	NA	NA	NA	NA	10	NA	

Did the data verify the acceptable knowledge? Yes <sup>10/11/03</sup> No  
 If not, describe the basis for assigning the EPA Hazardous Waste Numbers:

## NOTES:

- a The concentration for every analyte is in ppmv except for that of Hydrogen and Methane which is in vol%. ND = Not Detected, NA = Not Analyzed;  
 Normal distribution was assumed for all compounds because of limited detected data.
- b No entry indicates no associated EPA HWN assigned to the waste stream.
- c Required only for S3000 and S4000 waste streams.
- d trans-1,2-Dichloroethylene was not analyzed because headspace gas sampling and analysis was conducted prior to January 9, 2002.

**Data Summary Report -Table 1: Headspace Gas Summary Data****Waste Stream #: OS-00-01, WIPP Eligible OSR Sealed Source****1B: Tracking Summary for Tentatively Identified Compound**

Waste Stream Number			OS-00-01
Analytical Procedure Used to Acquire the Data			TWCP-QP-1.2-040
Running total of Number of Samples Analyzed for this Waste Stream Lot			2
Analytical Batch Data Report Identifier	Date Entered	Samples Analyzed in Batch Data Report	Chemical Identity of TIC
LA01-HGAS-024	10/17/2002	2	None
Running Total of Number of Detections			N/A
Calculated % of TIC Detection			N/A

## Data Summary Report – Table 2: Solid Sampling Summary

WSPF # LA-OS-00-01– WIPP eligible OSR sealed sources

**Determination of Number of Retrievably Stored Waste Containers to Sample (S3000, S4000)**Preliminary Estimates of Mean, Variance, and Coefficient of Variation: N/A

Attach a table(s) that correlates container identification numbers to data packages if different from containers used for characterization.

Description of Source Data: N/ASamples Randomly Selected from Waste Stream (yes/no)? N/ATreatment of less-than-detectable measurements: N/AAnalytes that are listed spent solvents and therefore not included in the calculation to determine the number of containers to sample: N/ASelected coefficient of variation and associated analyte: N/ATotal Calculated number of containers to sample: N/AAttached preliminary estimates: N/A**Retrievably Stored Waste Sampling Results**Analytes that are listed spent solvents and therefore not included in the UCL<sub>90</sub> estimate calculation to determine the toxicity characteristic: N/ALargest Coefficient of Variation and associated analyte: N/A**Comparison of largest coefficient of variation with coefficient of variation selected from preliminary estimate: N/A**Treatment of less-than-detectable measurements: N/ATransformations applied to data and justification: N/ADrums overpacked for shipment/WWIS tracking (Yes/No)? N/A

If yes, overpack container identification number:

Sampled drums included in waste stream lot reported here (Yes/No)? N/A

If no, WSPF # including sampled drums:

**Newly Generated Waste Sampling Results**Batch or continuous process? N/ASamples randomly selected from Waste Stream? (Yes/No) N/ASample location (part of process): N/ATreatment of less-than-detectable measurements: N/ATransformations applied to data and justification: N/A

## Data Summary Report – Table 3: Metals Summary Data

WSPF Number: LA-OS-00-01 – WIPP eligible OSR sealed sources <sup>a</sup>

Sampling and Analysis Method/Units (check one):

- ☐ Totals (units are in mg/kg)  
☐ TCLP (units are in mg/L)

Analyte	# Samples	Mean	SD	UCL <sub>90</sub>	RTL	EPA Code
Antimony	N/A <sup>b</sup>	N/A	N/A	N/A	N/A	N/A
Arsenic	N/A	N/A	N/A	N/A	N/A	N/A
Barium	N/A	N/A	N/A	N/A	N/A	N/A
Beryllium	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium	N/A	N/A	N/A	N/A	N/A	N/A
Chromium	N/A	N/A	N/A	N/A	N/A	N/A
Lead	N/A	N/A	N/A	N/A	N/A	N/A
Mercury	N/A	N/A	N/A	N/A	N/A	N/A
Nickel	N/A	N/A	N/A	N/A	N/A	N/A
Selenium	N/A	N/A	N/A	N/A	N/A	N/A
Silver	N/A	N/A	N/A	N/A	N/A	N/A
Thallium	N/A	N/A	N/A	N/A	N/A	N/A
Vanadium	N/A	N/A	N/A	N/A	N/A	N/A
Zinc	N/A	N/A	N/A	N/A	N/A	N/A

Did the data verify the acceptable knowledge? ☐ Yes ☐ No ☒ NA *PL 4114103*

If not, describe the basis for assigning the EPA Hazardous Waste Codes.

## Notes:

<sup>a</sup> OS-00-01 wastes are Noncombustible Inorganic Debris Wastes (see AK Summary). "N/As" are assigned for all analytes.<sup>b</sup> N/A: Not Applicable

## Data Summary Report – Table 4: Total VOC Summary Data

WSPF Number: LA-OS-00-01 – WIPP eligible OSR sealed sources <sup>a</sup>

## 4A

Analyte	# Samples	Mean (mg/Kg)	SD (mg/Kg)	UCL <sub>90</sub> (mg/Kg)	RTL (mg/Kg)	EPA Code
1,1-Dichloroethylene	N/A	N/A	N/A	N/A	N/A	N/A
1,2-dichloroethane	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A
1,4-Dichlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A
1,1,1-Trichloroethane	N/A	N/A	N/A	N/A	N/A	N/A
1,1,2-Trichloro-1,2,2-Trifluoroethane	N/A	N/A	N/A	N/A	N/A	N/A
1,1,2-Trichloroethane	N/A	N/A	N/A	N/A	N/A	N/A
1,1,2,2-Tetrachloroethane	N/A	N/A	N/A	N/A	N/A	N/A
Acetone	N/A	N/A	N/A	N/A	N/A	N/A
Benzene	N/A	N/A	N/A	N/A	N/A	N/A
Bromoform	N/A	N/A	N/A	N/A	N/A	N/A
Butanol	N/A	N/A	N/A	N/A	N/A	N/A
Carbon disulfide	N/A	N/A	N/A	N/A	N/A	N/A
Carbon tetrachloride	N/A	N/A	N/A	N/A	N/A	N/A
Chloroform	N/A	N/A	N/A	N/A	N/A	N/A
Chlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A
Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A
Ethyl ether	N/A	N/A	N/A	N/A	N/A	N/A
Formaldehyde	N/A	N/A	N/A	N/A	N/A	N/A
Isobutanol	N/A	N/A	N/A	N/A	N/A	N/A
Methanol	N/A	N/A	N/A	N/A	N/A	N/A
Methylene Chloride	N/A	N/A	N/A	N/A	N/A	N/A
o-Xylene	N/A	N/A	N/A	N/A	N/A	N/A
m,p-Xylene	N/A	N/A	N/A	N/A	N/A	N/A
Methyl ethyl ketone	N/A	N/A	N/A	N/A	N/A	N/A
Pyridine	N/A	N/A	N/A	N/A	N/A	N/A
Tetrachloroethylene	N/A	N/A	N/A	N/A	N/A	N/A
Toluene	N/A	N/A	N/A	N/A	N/A	N/A
Trans-1,2-Dichloroethylene	N/A	N/A	N/A	N/A	N/A	N/A
Trichloroethylene	N/A	N/A	N/A	N/A	N/A	N/A
Trichlorofluoromethane	N/A	N/A	N/A	N/A	N/A	N/A
Vinyl Chloride	N/A	N/A	N/A	N/A	N/A	N/A

## 4B

Tentatively Identified Compounds	Maximum Observed Estimated	# Samples Containing TIC
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Did the data verify the acceptable knowledge? ☐ Yes ☐ No ☒ NA ml 4/14/03  
 If not, describe the basis for assigning the EPA Hazardous Waste Codes.

## Notes:

<sup>a</sup> OS-00-01 wastes are Noncombustible Inorganic Debris Wastes (see AK Summary). "N/As" are assigned for all analytes.

<sup>b</sup> N/A: Not Applicable

## Data Summary Report – Table 5: Total SVOC Summary Data

WSPF Number: LA-OS-00-01 – WIPP eligible OSR sealed sources <sup>a</sup>

## 5A

Analyte	# Samples	Mean (mg/Kg)	SD (mg/Kg)	UCL <sub>90</sub> (mg/Kg)	RTL (mg/Kg)	EPA Code
1,2-Dichlorobenzene	N/A <sup>b</sup>	N/A	N/A	N/A	N/A	N/A
1,4-Dichlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dinitrophenol	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dinitrotoluene	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor 1016	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor 1221	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor 1232	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor 1242	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor 1248	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor 1254	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor 1260	N/A	N/A	N/A	N/A	N/A	N/A
Cresols	N/A	N/A	N/A	N/A	N/A	N/A
Hexachlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A
Hexachloroethane	N/A	N/A	N/A	N/A	N/A	N/A
Nitrobenzene	N/A	N/A	N/A	N/A	N/A	N/A
Pentachlorophenol	N/A	N/A	N/A	N/A	N/A	N/A
Pyridine	N/A	N/A	N/A	N/A	N/A	N/A

## 5B

Tentatively Identified Compounds	Maximum Observed Estimated (ppmv)	# Samples Containing TIC
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Did the data verify the acceptable knowledge? ☐ Yes ☐ No ☒ NA <sup>ml</sup> 4/14/03

If not, describe the basis for assigning the EPA Hazardous Waste Codes.

## Notes:

<sup>a</sup> OS-00-01 wastes are Noncombustible Inorganic Debris Wastes (see AK Summary). "N/As" are assigned for all analytes.

<sup>b</sup> N/A: Not Applicable

**Data Summary Report – Table 6: Exclusion of Prohibited Items**WSPF No. LA-OS-00-01

In accordance with the *Los Alamos National Laboratory Transuranic Waste Quality Assurance Project Plan* (TWCP-PLAN-0.2.3-001), current revision, section B-1, the absence of prohibited items is documented through acceptable knowledge. Radiography or visual examination is performed on each container in this waste stream to verify the absence of the following prohibited items:

- Free liquids (residual liquids are limited to less than 1 percent payload container volume)
- Non-radionuclide pyrophoric materials
- Waste incompatible with backfill, seal and panel closure materials, container and packaging materials, shipping container materials, or other wastes
- Explosives or compressed gases
- PCBs in concentrations greater than 50 ppm
- Waste exhibiting the characteristics of ignitability, corrosivity, or reactivity
- Non-mixed hazardous waste

**RTR/VE Summary of Prohibited Items and AK Confirmation**WSPF Number: LA-OS-00-01 – WIPP eligible OSR sealed sources

Drum ID	RTR BDR	RTR WMC	RTR Prohibited Item	VE BDR	VE WMC	VE Prohibited Item	Waste Form and WS Confirmation	Waste stream
58565	NA	NA	None	LA01-OSR-VE-004	S5100	None	Yes	OS-00-01
58567	NA	NA	None	LA01-OSR-VE-004	S5100	None	Yes	OS-00-01

**Note**

Off-site Source Recovery wastes are newly generated wastes. These containers are visually examined in lieu of radiography.

## Acceptable Knowledge Summary Data

Waste Stream Number	OS-00-01
Waste Stream Name	WIPP-eligible OSR sealed sources
Waste Matrix Code	S5100
Point of Generation	Los Alamos National Laboratory, TA-3, Chemistry, Materials, and Research (CMR) Facility
Waste Stream Volume	214 sources; 149 drums
Generation Dates	2001-2006
TRUCON Codes	LA120A and LA220A
TWBIR No.	N/A (The OSR TWBIR is not included in the current TBIR)
IDC Code	N/A for newly generated waste
Generating Processes	Sealed sources are identified by OSR Project personnel for potential collection. Documentation is obtained, their recovery from the field is arranged, and the disposition of the sealed sources is determined. The sources are packaged for disposal and brought to LANL for storage and/or transfer to WIPP by TWCP.
AK Report Number	OSR-MISC-003
RCRA Determinations	None
Radionuclide Information	The primary radionuclides of these sources are Pu-238, Pu-239, and Am-241. Potential radionuclide contaminants include Np-237, Pu-240, Pu-241, Pu-242, Pu-244, Cs-137, and Sr-90.
Layers of Confinement	Sources accepted for disposal are fully encapsulated or contained in metallic cladding and are placed into metal and/or plastic cans which are then placed into pipe components. The pipe component is lined and/or surrounded by fiberboard dunnage or polyethylene shielding. Cans are vented and bags may have carbon filters. When bags are used all closures are by the twist, tie, and tape method. Bagged items are placed in an unlined pipe overpack or a 55-gallon drum lined with a maximum of two 5-mil or greater PVC (polyvinyl chloride) bags. Liner bags are folded over, without closures.

*Sandy Warden*

Site Project Manager Signature

4-14-03

Date

**Waste Stream Number: OSR-00-01**

**Waste Stream Name: WIPP-Eligible OSR Sealed Sources**

**Waste Stream Description**

Non-mixed inorganic debris waste comprised of defense-related sealed sources recovered off-site and packaged by the Off-Site Source Recovery (OSR) project. The sealed sources consist of radionuclide (actinide) solids (e.g., Am, Pu, AmBe, PuBe) that are encapsulated in metal jackets. The actinides are in either metal or metal oxide form. Waste is packaged in pipe component overpack configuration in 55 gallon drums.

**Waste Material Parameter List**

**Waste Materials**

The waste material parameter for sealed sources is other metals (OM).

**Packaging Materials**

The packaging configurations for OSR packaging containers are standardized with known weights of waste material parameters. The components are the steel drum and pipe component (ST); rigid liner, liner lid, neutron shielding (water-extended polymer or equivalent) (PP); cane fiberboard and the POC insert (C); and the shield insert body and lid (water-extended polymer or equivalent) (OM).

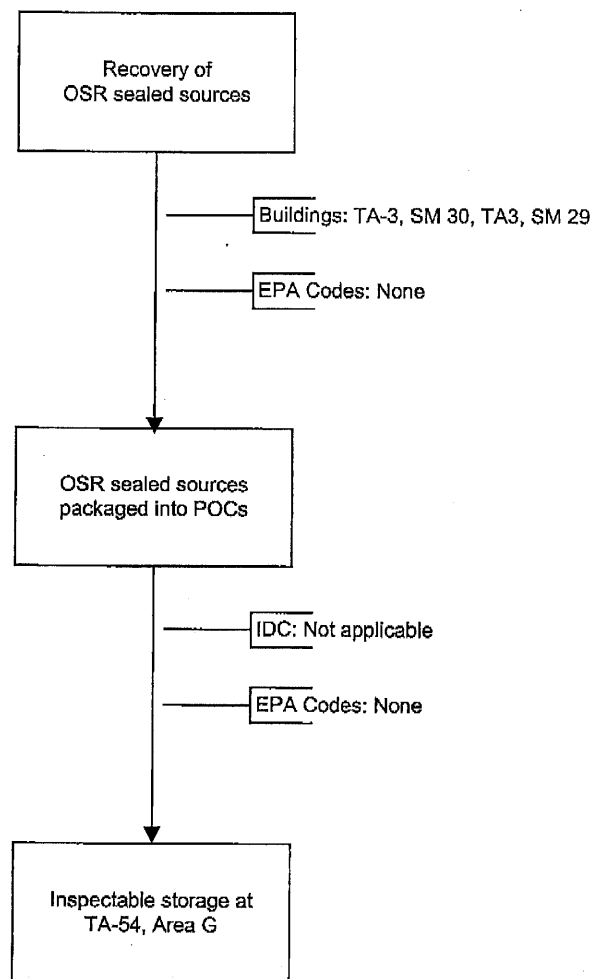
**Point of Generation**

This waste stream is generated at Los Alamos National Laboratory (LANL), Los Alamos, NM at one of the following facilities (see Attachment 1):

- TA-3, SM-30, during the initial receipt of OSR sealed sources at LANL.
- TA-3, Chemistry, Materials, and Research (CMR) Facility
- TA-55
- TA-54, Area G.

**Generation Process**

Sealed sources are identified for potential collection by the Off-Site Source Recovery (OSR) Project. The sources are recovered from various locations and are shipped directly to LANL. All sources are packaged in WIPP compliant containers. OSR personnel determine the disposition of these sealed sources, and identify those that are eligible for disposal at WIPP. Figure 1 provides a summary of the waste stream.



**Figure 1. Waste Generation Summary Diagram.**

## **Defense Related**

The sealed sources were used at defense facilities for weapons research and in the naval reactors program, categories listed in the WIPP Waste Analysis Plan as defense-related activities. The source owner(s) has(ve) provided documentation to justify defense eligibility.

## **Delineation of the Waste Stream**

The OSR Project recovers sources that have both defense and non-defense applications. Only the defense sources are eligible for WIPP disposal and they constitute waste stream OS-00-01. The non-defense sources constitute waste stream OS-00-02 and are not currently eligible for disposal at WIPP.

An assumption is that small differences from one defense source to another are insufficient to require delineation as separate waste streams. OSR waste intended for disposal at WIPP consist only of excess, manufactured sealed sources containing actinide isotopes, encapsulated in metal jackets or casings, or packaged in a configuration such that the first material contacted by radiations from the source is a metal.

All sealed sources currently identified for WIPP disposal contain varying combinations of plutonium, americium, or other transuranic elements, may or may not contain beryllium or other light elements to create neutron emission, and have similar physical construction.

## **Waste Matrix Code Assignment**

Since the waste is considered debris, the waste matrix code S5100 (inorganic debris) applies.

## **Prohibited Items**

OSR sealed sources are produced from a closed system (manufactured, isotopic sources sealed in a metal jacket or casing) that precludes the introduction of items such as compressed gases, free liquids, nonradionuclide pyrophorics, containers greater than 4 liters, or explosives. There are no prohibited items in this waste stream as verified by AK documentation and visual inspection during packaging.

## **Ignitability, Corrositivity, and Reactivity**

OSR sealed sources constitute a closed system (manufactured, solid isotopic sources sealed in metal jackets or casings) that preclude the introduction of extraneous materials that would be ignitable, reactive, or corrosive. The waste itself is not ignitable, reactive, or corrosive. VE performed during packaging of the sealed sources into drums is used to verify the absence of any indicators of ignitable, reactive, or corrosive wastes.

## **Toxicity Characteristics**

OSR sealed sources do not contain any constituents that qualify as toxicity characteristic hazardous waste.

## **Listed Waste**

No Listed EPA Hazardous Waste Numbers are applicable to this waste stream.

## **Polychlorinated Biphenyls (PCBs)**

OSR review of the manufacturing data verifies the absence of PCBs in OSR sealed sources. VE performed during packaging of the OSR sealed sources into drums verifies the absence of any indicators of PCBs.

## **Radionuclide Content of the Waste Stream**

The primary radionuclides contributing to the Curie content of these sources are Pu-238, Pu-239, and Am-241. Initial radiological data are typically well documented by the manufacturers for these sources. The isotopic compositions have been calculated by LANL (TWCP-09576) and are determined by NDA direct analysis. TWCP personnel determine the total radioactive material and isotopic composition of TRU nuclides for items in each OSR TRU waste payload container using appropriate TWCP radioassay procedures. TWCP personnel use radioassay equipment qualified under the corresponding Performance Demonstration Program (PDP) requirements and certified by the DOE Carlsbad Area Field Office.

### **Pu-238 and Pu-239 Sources**

The OS-00-01 waste stream consists of manufactured sealed solid isotopic sources. The designated material type is used to describe the isotopic composition of common blends of radioactive material. The primary plutonium material types used in sealed sources are MT-83 for the Pu-238 sources and MT-50 for the Pu-239 sources. The plutonium isotopes Pu-240, Pu-241, Pu-242, and Pu-244 are present in significantly lesser amounts for material types 83 and 50. Other potential radionuclide contaminants present due to decay or transmutation are Am-241, Cs-137, Np-237, Sr-90, U-233, U-234, U-235, and U-238.

Pu-242 cannot be measured by gamma spectroscopy, so its abundance is calculated based on empirical isotopic correlations for other waste containers with small fractions of Pu-242. In some cases, Pu-242 is estimated using an iterative procedure based on active and passive neutron data from a single waste container if the plutonium isotopic ratios are known for the other plutonium isotopes.

In Pu-238 sources, U-234 is expected to be present as a decay product. U-234 content must be estimated because this isotope cannot be reliably measured using NDA techniques. The Pu-238 content provides the basis for estimating an upper bound for U-234 based on the rate of decay of the precursor, Pu-238, the assumption that there is no

other source of uranium in the waste material, and conservatively assuming an ingrowth period of 45 years (TWCP 10446).

Representative radionuclide data for two Pu-239 sealed sources from the waste stream have been compiled and are presented in Table 1 for completeness. Ten specific radionuclides measured are listed, and averages, standard deviations, and maximum/minimum values provided. Total plutonium content, thermal power, total activity, total alpha activity, TRU concentrations, Pu equivalents, and fissile gram equivalent data have also been provided. These values are based on the NDA-measured detected values for 2 containers.

The values in Table 1 show that the two major isotopes are Pu-239 and Pu-240, as expected for MT-50 sources and confirming AK information. Low levels of Am-241, Cs-137 and Np-237 were detected. The uranium isotopes were assayed but not detected. The Sr-90 content is estimated from the Cs-137 content assuming that the activity ratio is 1:1.

#### **Am-241 Sources**

Manufacturing data for this material type provides the basis for estimating an upper bound for Am-241 content. The Am-241 present in sealed sources is greater than 99 percent by weight. Other potential radionuclide contaminants in these sources are Pu-239, Pu-241, Pu-242, Pa-233 and U-233.

#### **Cs-137 and Sr-90**

No sealed sources containing Cs-137 or Sr-90 were introduced into the OSR waste stream. Cs-137 is a product of the spontaneous fission of Pu-238, Pu-239, and especially Pu-240. Cs-137 is also a trace contaminant in purified plutonium from the production reactors. In the latter case the remaining Cs could be on the order of 0.5 ng/g Pu. In the former instance the formation of Cs-137 due to spontaneous fission would lead to about 0.4 pg/g Pu in plutonium that is 10 years old. Because Cs-137 due to spontaneous fission is about a factor of a thousand less than that due to residual contamination from the original separation on the production fuel, the latter is the dominant source of Cs.

In plutonium production runs, Cs-137 and Sr-90 are produced at approximately the same atom level. These two nuclides have very similar half-lives (~ 30 y) and will therefore be present at roughly the same activity level prior to commencement of any processing operations. If it is assumed that Sr and Cs are not fractionated from one another during chemical processing, Cs-137 may be used as a marker for Sr-90 activity ratio of 1:1, yielding an estimated value for Sr-90. While this cannot be considered a valid assay method, LANL has adopted it as an "operationally defined" means for estimating the Sr-90 content in the OS-00-01 waste stream.

#### **Other Radionuclides Introduced as Feed Material**

No other radionuclides are introduced through the feed material.

**Table 1. Nondestructive Assay Measurement of Radionuclides  
Present in Pu-239 Sources in the Waste Stream**

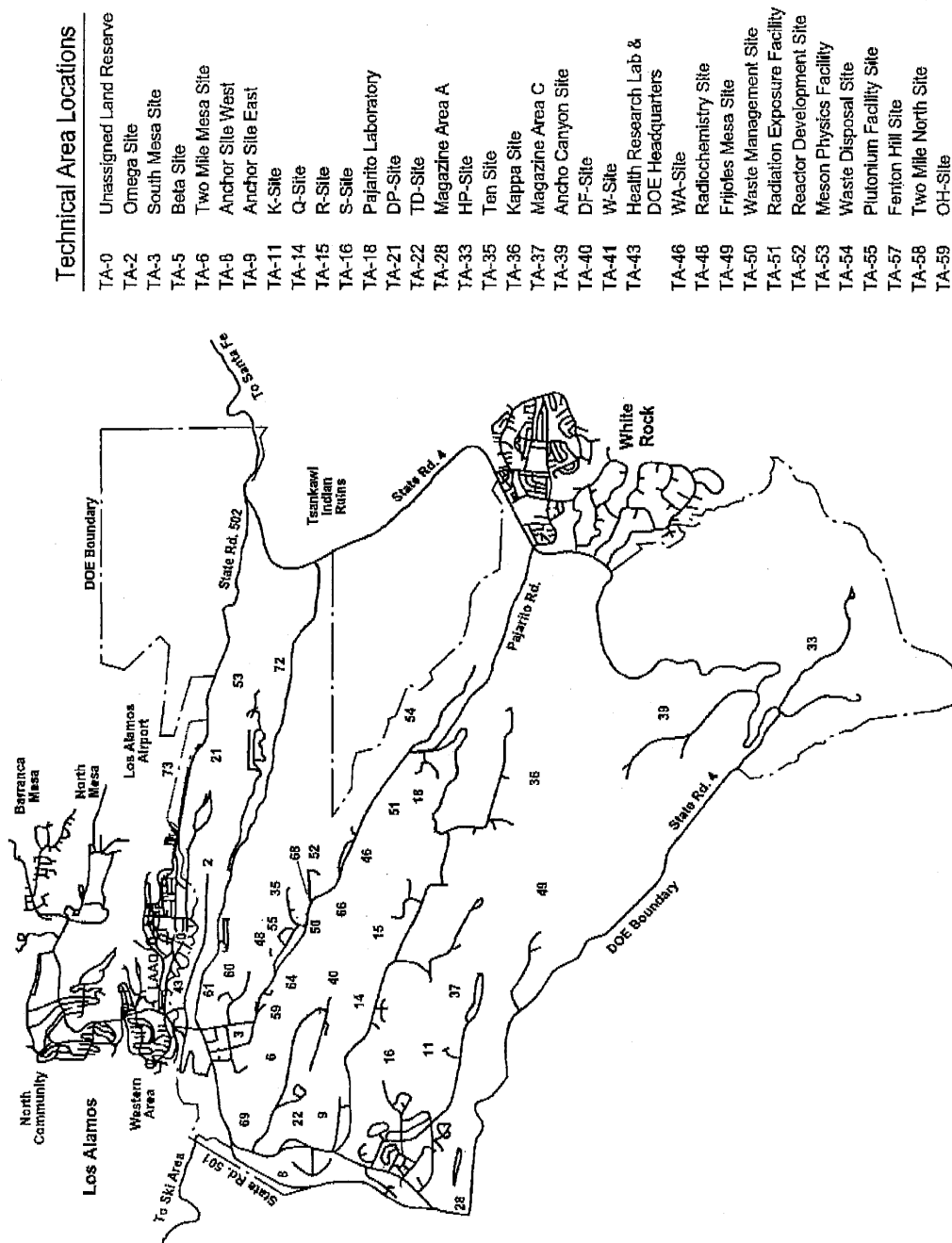
Radionuclide	Average <sup>a</sup>	Standard Deviation	Minimum	Maximum
Total Pu (g)	4.495E+01	2.475E+00	4.320E+01	4.670E+01
Pu-238 (g)	4.465E-02	4.596E-03	4.140E-02	4.790E-02
Pu-239 (g)	3.535E+01	4.950E-01	3.500E+01	3.570E+01
Pu-240 (g)	9.510E+00	1.966E+00	8.120E+00	1.090E+01
Pu-241 (g)	3.060E-02	5.091E-03	2.700E-02	3.420E-02
Pu-242 (g)	1.058E-02	4.130E-03	7.660E-03	1.350E-02
U-233 (g)	<LLD <sup>b</sup>	<LLD <sup>b</sup>	<LLD <sup>b</sup>	<LLD <sup>b</sup>
U-234 (g)	<LLD <sup>b</sup>	<LLD <sup>b</sup>	<LLD <sup>b</sup>	<LLD <sup>b</sup>
U-235 (g)	<LLD <sup>b</sup>	<LLD <sup>b</sup>	<LLD <sup>b</sup>	<LLD <sup>b</sup>
U-238 (g)	<LLD <sup>b</sup>	<LLD <sup>b</sup>	<LLD <sup>b</sup>	<LLD <sup>b</sup>
Am-241 (g)	3.450E-01	4.101E-02	3.160E-01	3.740E-01
Cs-137 (g)	1.515E-06	3.536E-08	1.490E-06	1.540E-06
Sr-90 (g) <sup>c</sup>	9.67E-07	2.56E-08	9.49E-07	9.86E-07
Np-237 (g)	7.455E-03	7.071E-06	7.450E-03	7.460E-03
Thermal Power (W) (Decay Heat)	1.176E-01	1.392E-01	1.920E-02	2.160E-01
Total Activity (Ci)	9.609E+00	1.085E+00	8.842E+00	1.038E+01
Total Alpha Activity (Ci)	6.380E+00	5.374E-01	6.000E+00	6.760E+00
TRU Concentration (nCi/g)	3.190E+07	2.687E+06	3.000E+07	3.380E+07
Pu Curie Equivalent (Ci)	6.375E+00	5.586E-01	5.980E+00	6.770E+00
Fissile Gram Equivalent (g)	3.570E+01	5.657E-01	3.530E+01	3.610E+01

<sup>a</sup> Average, standard deviation, minimum and maximum values are based on NDA-measured detected values for 2 containers.

<sup>b</sup> <LLD = less than the lower limit of detection.

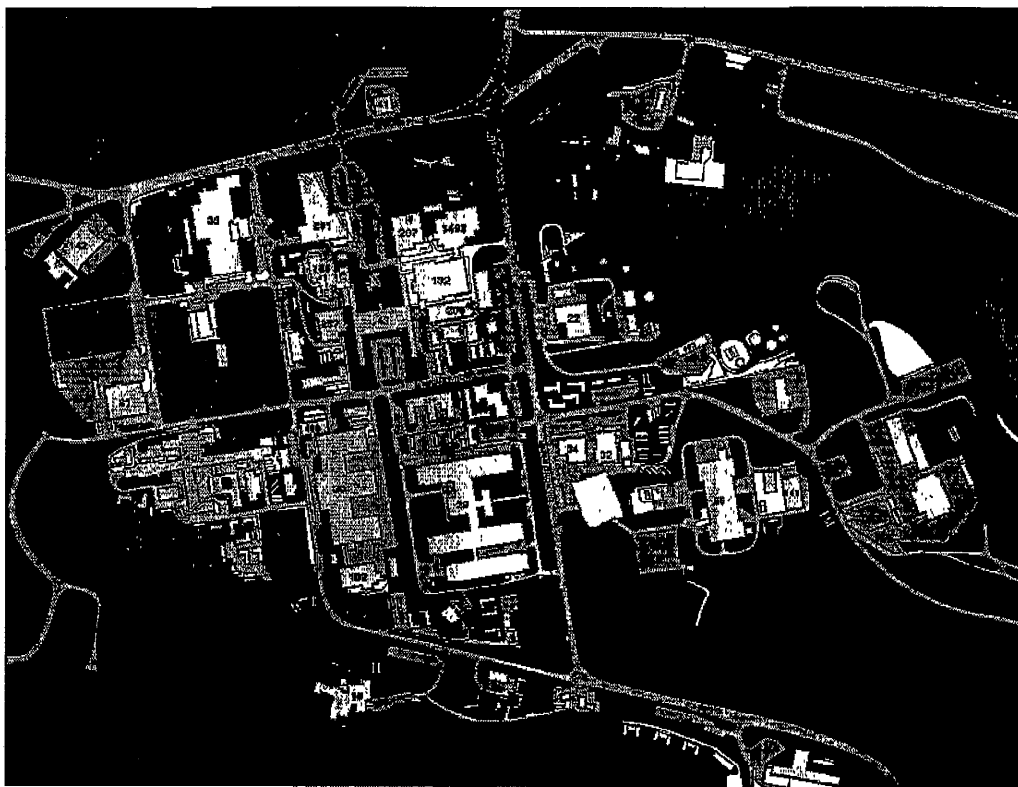
<sup>c</sup> Sr-90 (g) values are calculated from those for Cs-137 assuming that the activity ratio is 1:1.

## LOCATION MAPS FOR FACILITIES HANDLING OSR SEALED SOURCES



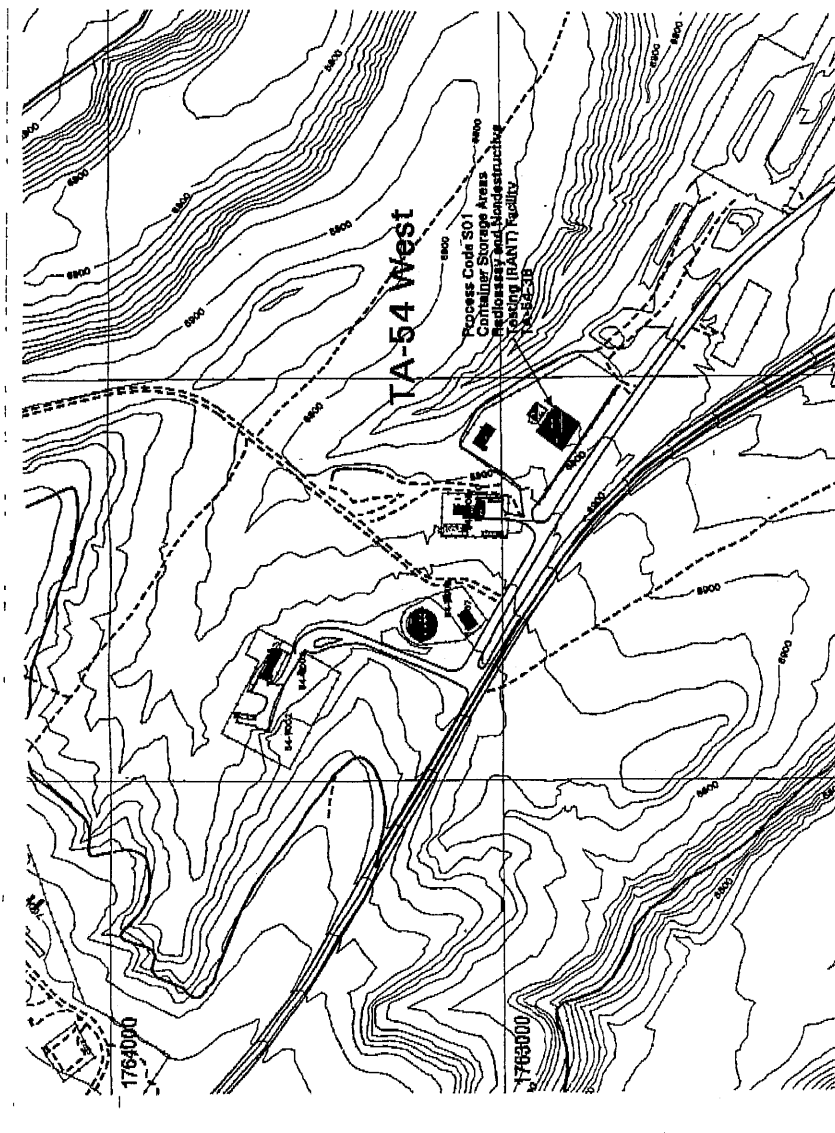
**Location map for LANL technical areas (TA) showing locations  
at which OSR Project activities occur**

- TA-3, SM-30, initial receipt of OSR sealed sources at LANL
- TA-3, CMR facility, interim storage and visual examination of OSR sealed sources
- TA-46, OSR Project office
- TA-54, Area G, interim storage of OSR sealed sources
- TA-55, interim storage of OSR sealed sources

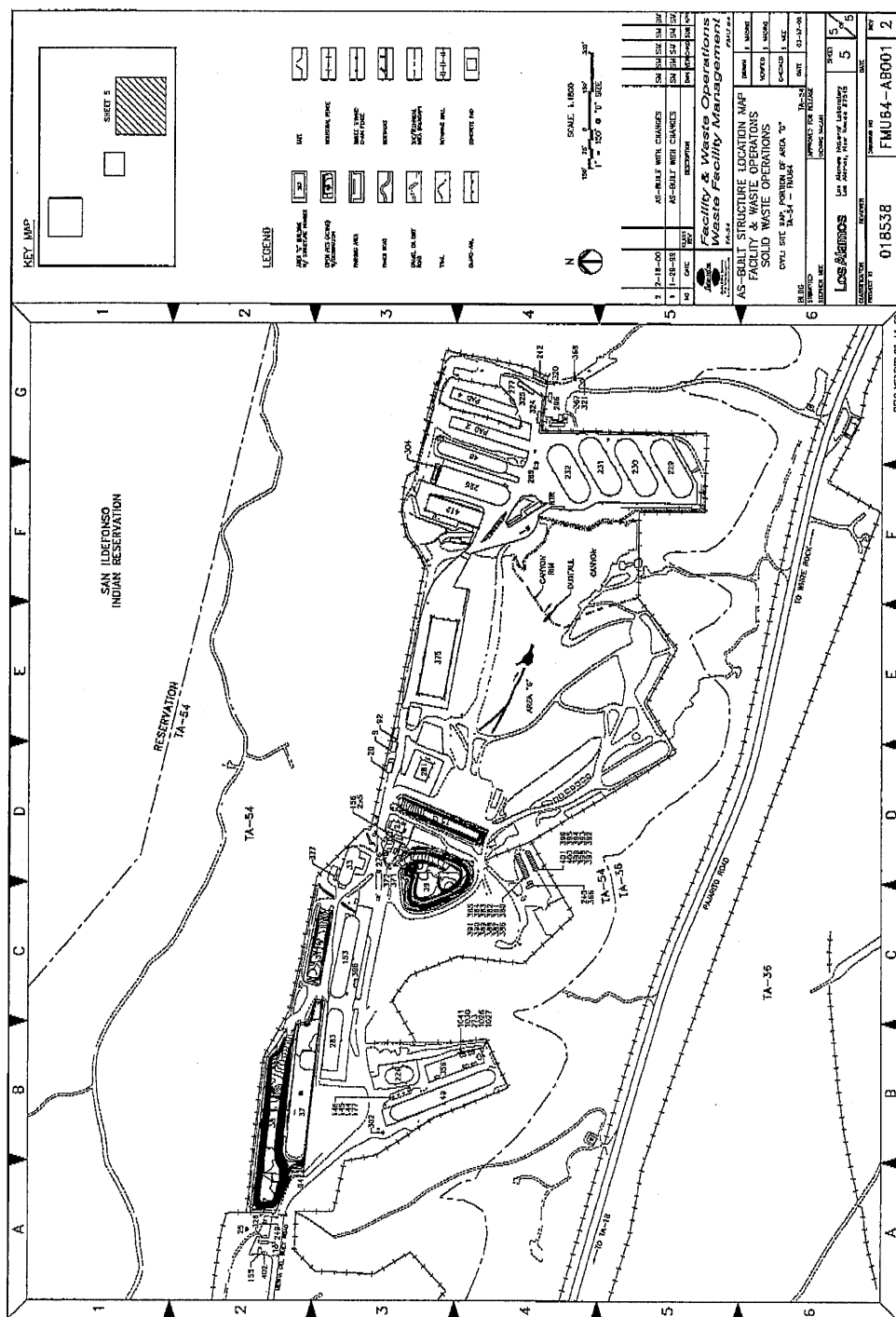


**Detailed map of LANL Technical Area (TA) 3, showing facilities in this area  
in which OSR Project activities occur**

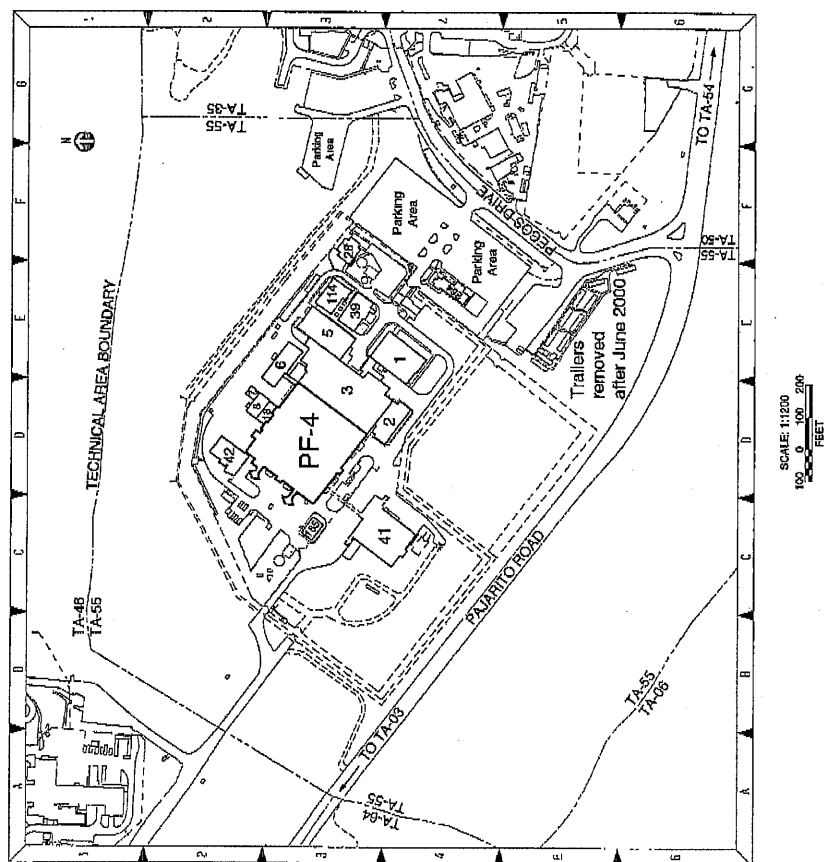
- TA-3, SM-30, initial receipt of OSR sealed sources at LANL
- TA-3, SM-29 (CMR facility), interim storage and visual examination of OSR sealed sources



Map of TA-54 West (with RANT Facility)



### Map of TA-54 TRU Waste Storage Domes



Map of TA-55

**Note:** The Plutonium Facility, Building PF-4, is labeled PF-4 on this map.